

This Week in SP333:6031: Homework, etc.

for the week of 20 August

Homework must be submitted stapled in assignment groupings.

Always attempt to complete the readings before class. You are responsible for reading 10 pages past the current lecture. You may not understand the material completely, but you must read it prior to lecture.

Problems to submit on the date listed:

Week of 20 Aug

Monday :	Read B&O chapter 1 Bring a printed copy of Problem Solving and Newton's Laws find it : http://physics.usna.edu/physics/Faculty/tank/SP333/SP333Support.html #12 under local access
Tuesday:	submit A1, (chapter)1: 1, 6
Thursday:	submit A3, 1:5, 7
Friday:	1: 7, 14

Hints

5. Compare to a mass m_1 on a horizontal frictionless table connected by a cord to a hanging mass m_2 .
 $a = m_2g/(m_1+m_2)$. Find d^2x/dt^2 . Solve the second order diffy Q or multiply through by the integrating factor dx/dt . Integrate once to find $v(x)$ and then again w.r.t. time to find $x(t)$.
6. Integrate the equations twice. Be sure to use limits and dummy variables as appropriate.

Auxiliary Problems

- A1 A hot air balloon rises from the ground at time $t = 0$ s with a constant acceleration of $g/6$ upward. At $t = 2$ s, an apple is released from the balloon at a point even with the bottom of the gondola (basket). Find an expression for the velocity of the apple for $t > 2$ s. Sketch the position vs. time plot for the apple. When does the apple reach its high point ? When does the apple hit the ground ?
- A2 We can use the chain rule to re express $a = dv/dt$ as $dv/dx (dx/dt) = v (v/dx)$. For the case of constant acceleration, integrate $a = v (v/dx)$ with respect to x to develop equation 2-13 in Tipler. Remember to use a dummy variable inside the integral, to use limits on the integral and to properly follow the change of variable procedure.
- A3 Range along an inclined hill. A projectile is fired from the ground at speed v_0 and at an angle θ above the horizontal along a hill inclined at α relative to the horizontal. Find an expression for the range of the projectile as measured along the hill's surface.